Appendix B

A Brief User's Guide to the Shrimp Model

The shrimp model is designed to estimate the economic impacts associated with the harvesting of shrimp by U.S. commercial fishermen. These impacts are expressed in terms of employment (full-time equivalent jobs), personal income, and output (sales by U.S. businesses).

The scope of the model includes the activities of commercial fishermen, dealers/processors and wholesalers/distributors. For dealers/processors and wholesalers/distributors, only activities associated with domestically-harvested shrimp are addressed. Excluded from the model's estimates are the activities at the retail level – either food markets or restaurants – and activities associated with shrimp produced from U.S. aquaculture operations or from imported shrimp.

User Inputs

The model is designed to generate estimates from a single input—the value of shrimp landings in 2001. All subsequent calculations are based on this variable.

Model Outputs

The model generates estimates for three types of impacts—employment, income, and output. Each of these impacts is expressed as direct, indirect, and induced effects as well as the total of these effects.

Estimates are also disaggregated by major segments of the harvesting and seafood industries. The principal means of harvesting shrimp are by trawl and by butterfly net. Estimated impacts associated with these gear types are provided. Similarly, estimated impacts associated with dealers/processors and with wholesalers/distributors are provided.

Print macros allow the user to generate a hard copy of model inputs and outputs in a variety of combinations as noted below. Using the control key and a letter activates each macro.

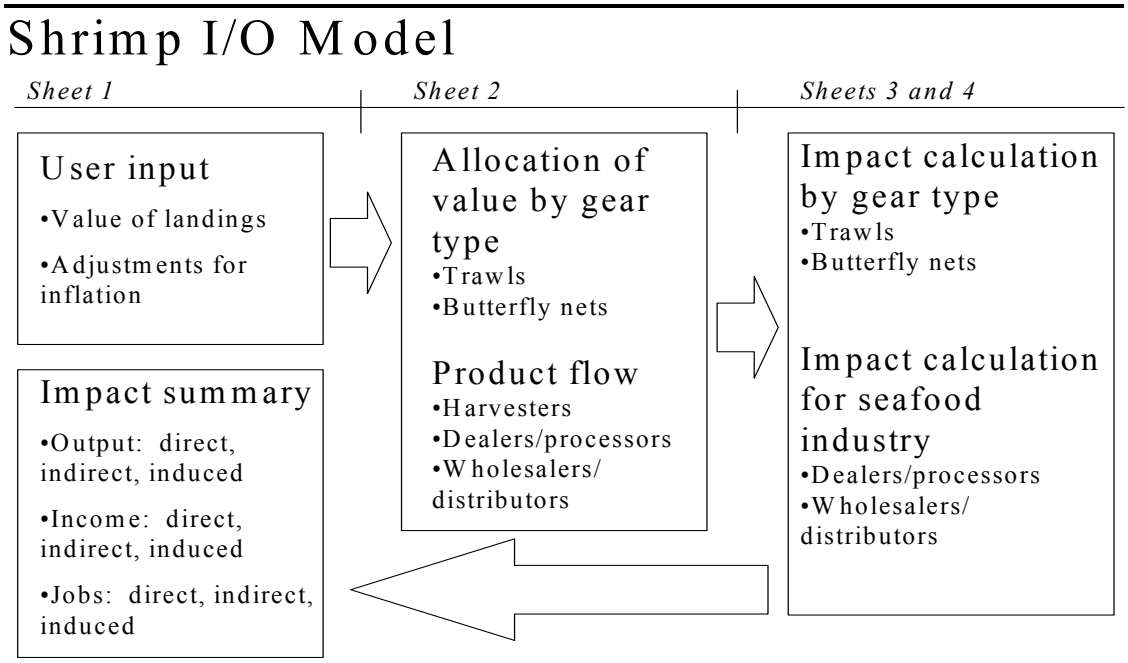
- Ctrl + a Prints all impacts
- Ctrl + e Prints employment impacts
- Ctrl + p Prints personal income impacts
- Ctrl + o Prints output impacts
- Ctrl + i Prints landings inputs
- Ctrl + t Prints all inputs and all impacts

Adjustments for Inflation

Because the estimates are based on IMPLAN's model of the national economy in 2000, the most recent year available, two adjustments for inflation have been incorporated. The value of landings in 2001, the most recent year available, is converted to year 2000 dollars before impacts are estimated. After estimates of personal income and output are created, they are converted to year 2003 dollars. Employment impacts expressed as full-time equivalent jobs are not adjusted.

Model Structure

Built in Microsoft Excel, the model comprises an interrelated set of seven worksheets. The general operation of the model is shown in the following chart.



Each worksheet addresses a distinct set of estimating issues as noted in the following table. Note that three worksheets amount to working files of background data for the model and include information not directly used in the calculation of estimates.

Model worksheets	Description
User inputs and model outputs	This is the only worksheet a user needs to access. Value of landings data is entered here. This sheet provides all inflation adjustments to input data and outputs. Output tables and print macros are on this sheet.
Species-gear types, product flow	The value of shrimp landings are allocated to the two dominant gear types—trawls and butterfly nets—that account for 97 percent of the value of all U.S. shrimp landings. All value of landings is allocated between dealers/processors and

Model worksheets	Description
	wholesalers/distributors. Products of dealers/processors are partially allocated to wholesalers/distributors.
Calculations-Harvesters	Value of landings is converted to costs and earnings for each gear type. Cost categories (e.g., fuel purchases by harvesters) are then used to estimate impacts. Wages and profits are treated as income, creating induced effects.
Calculations-Seafood Industry	Value of landings and a portion of dealers/processor sales are converted to costs and earnings for dealers/processors and wholesalers/distributors. Cost categories (e.g., insurance and utilities purchases by these businesses) are then used to estimate impacts. Wages and profits are treated as income, creating induced effects.
Harvester cost earnings	Source data on harvester costs and earnings are presented. Not all data were directly used to create the cost-earnings profiles used by the model.
Dealer processor cost earnings	Source data on costs and earnings for dealers/processor and wholesalers/distributor operations are presented. Not all data were directly used to create the cost-earnings profiles used by the model.
Product flow data	Source data on product flow between harvesters, dealers/processors and wholesalers/distributors are presented. Not all data were directly used to create the product flow estimates for the model.

Limitations and Notes

The model does not account for all gear types associated with U.S. shrimp landings. Undetermined gear types account for 1.6 percent of the value of landings, while combined gears, pots and traps, and a miscellany of other gear types account for the remaining 1.4 percent. Rather than try to estimate the impacts associated with these other gear types, the model pro-rates all landings between trawls and butterfly nets. This introduces an unknown uncertainty into the estimates.

Although cost-earnings data for trawls were available, no such data for butterfly nets have been found. Instead data for inshore, multi-species fisheries from a project completed for New York Sea Grant was used for butterfly nets. This introduces an unknown uncertainty into the estimates. Data for South Carolina trawlers was used as an estimate of East Coast shrimp trawl operations. Data for west coast of Florida, Texas, and Gulf Coast shrimp trawlers was used to create an estimate of Gulf shrimp trawl operations. Using East Coast and Gulf landings as weights, these two estimates were combined to create a single cost-earnings profile for shrimp trawl operations.

Data on Southeast shrimp processing operations were used to create a weighted average cost-earnings profile for dealers/processors. These businesses ranged from de-heading, to peeling, to breading operations.

To determine costs and earnings for wholesalers/distributors, data from the New York Sea Grant project were used. These data apply to general seafood wholesale and distribution operations, not to ones specializing in shrimp.

Particularly difficult to find, product flow information used in the model is primarily derived from a study of Southeastern shrimp activity by Walter Keithly and Kenneth Roberts. This work dealt exclusively with shrimp harvesters and dealers/processors and was relatively detailed. Other flow data are available and included as source data in the model, but are for more diverse fish and seafood product mixes. While the Keithly and Roberts estimate of sales of shrimp from harvesters to dealers/processors was generally consistent with two other sources of fish and seafood product flow, Keithly and Roberts estimated that only 10 percent of the product of dealers/processors went to wholesalers/distributors. Two other sources of fish and seafood product flow found a higher proportion going from dealers/processors to wholesalers/ distributors. To the extent that Keithly and Roberts underestimate this product flow, the model underestimates the economic impacts of shrimp wholesalers/distributors.